a flexible track mounted at the peripheral edge of the touch screen, said flexible track being extendable along an axis extending inwardly on said screen;

means extending from said flexible track for provoking a touch detection by said touch screen; and,

means for detecting extension and retraction of said flexible track with respect to the peripheral edge of the touch screen and correlating the extension and retraction with a controller function.

Claim 93. (once amended) --The device for providing input to a touch screen of claim 25, [wherein said] further including a knob cap [includes] having a touch switch for connecting said battery to said touch signal generator in response to fingertip touch on said knob cap.

Remarks

In the present amendment claims 1, 25, 66, 73, 80, 83, 84, and 93 have been amended. In light of the changes to the claims and the discussion presented below, it is respectfully requested that the application be reexamined with a view toward allowance of all claims.

The present invention generally provides mechanical devices to enhance the input process for touch screen devices. A salient feature of the invention is the inputting of continuously variable functions or data using mechanical devices that provide the touch and feel of prior art mechanisms, such as rotary knobs, fader

(slider) devices, joysticks, switches, and the like. Any of these devices may be removably secured on the active surface of a touch screen. Thereafter, the device is operated; i.e., the knob or joystick is rotated, the fader controller is slidably actuated. The system receives the resulting touch inputs and analyzes them to determine the location and type of device that has been operated. The invention receives and interprets control inputs from the devices described herein, and initiates specific controller functions in response to the inputs. The devices may be removed and replaced at any location on the touch screen, so that the control setup may be adapted and modified in an infinite number of arrangements. Thus the invention exhibits the best aspects of mechanical controls (i.e., touch and feel) with the unlimited configurability of touch screens. The devices of the invention operate with virtually all commercially available touch screens. Applicant believes that this approach to control of electronic apparatus is not known in the prior art, and the citations in the instant Office Action confirm that belief.

In the instant rejection, claims 1, 2, and 16-19 stand rejected under 35 USC 102 over the Jaeger'956 patent, a reference having overlapping inventorship with the present application and obviously well known to applicants. This reference addresses the need for control devices to interact with a computer or similar machine that communicates with a user via a display. In the '956 patent, control devices such as knobs, faders, and the like are disposed to interact with the machine display to provide enhanced user interaction with the display. These general concepts of the reference are shared by the present invention.

However, the approach to implementing these concepts differs markedly in the present invention with respect to the reference. In the reference, control devices are designed to be applied directly to the output face or screen of the display. The position and movement of the control devices is detected by means of photoelectric sensors in the control devices that interact with designated graphic elements provided by the display output. As stated in col. 2, lines 14-18, "The invention enables photoelectric tracking of movement of the moveable member of a circuit control device using light produced by an electronic display screen which may also display graphics pertinent to operation of the control device." Thus, for example, "Each passage of the moving line 94 through the field of view of photosensor 32 causes the photosensor circuit 92 to deliver a location sensing signal to microprocessor 53. This enables the microprocessor 53 to determine the momentary location of the photosensor 32 and to adjust the control signal which is sent to the controlled circuit 54 to accord with the current position of the photosensor." (col. 13, lines 2-8.)

All of the embodiments described in the '956 reference operate in the same general manner described above. In the '956 reference, there is no touch screen provided whatsoever. Thus it is clear that the '956 reference does not teach any form of device that interacts with a touch screen to provoke a touch detection by the touch screen. Although the rejection of Paragraph 6 asserts that the control devices of the reference are applied to a touch screen, this interpretation of the reference is completely without any factual basis. Therefore it is asserted that the

rejection under §102 cannot be supported by the reference. Indeed, this reference would fail as a basis for a rejection under §103 for obviousness.

Another Jaeger reference, US patent no. 5,982,355 is cited in rejecting a large number of claims under §102. This reference describes a plurality of electronic control devices that are designed to be operated interactively with a display screen that is connected to a computer or similar apparatus. The control devices are placed on the display screen to enable the user to enter control commands and variables that correspond to graphic elements presented by the display screen. In this reference, the control devices are provided with sensors that detect movement or manipulation of the control device by the user, whereby the control signals may be generated and input to the computer or other apparatus. The '355 patent thus employs electrical or mechanical sensors to detect control device movements, in contrast to the '956 patent, which employs photoelectric sensors in the control devices to detect control movements by receiving designated portions of the display output and deriving control signals therefrom.

It must be emphasized that the '355 reference does not teach any form of device that interacts with a touch screen to provoke a touch detection by the touch screen. Although the '355 reference teaches that a touch screen may be employed in addition to its control devices, it is clear that the control devices to not interact with the touch detection process in any way. Indeed, it is plainly stated that the control devices are designed to avoid interaction with the touch detection process. For example, col. 6, lines 3-7: "FIG. 32 is a frontal view of a touch screen control panel wherein touching of the panel by an operator is sensed by optical means and

wherein a control device of the sliding knob and track type is provided on the panel without interfering with operation of the optical sensing means. Another example, col. 19, lines 38-42: "The present invention enables a control device 222 of this kind to be secured to the face 202 of the display screen 203 within the image display area without disrupting the grid 215 of infrared beams that enables detection of the location at which an operator's finger touches the face 202 of the screen."

It is manifestly clear that the '355 patent does not provide any teaching of a control device that interacts with a touch screen assembly to provoke a touch detection by the touch screen. The control devices of the '355 patent provide their own onboard sensors to detect control movements, rather than interacting with any touch screen. Thus the '355 patent fails to support the rejections under §102 or §103.

The van Ketwich reference is cited in rejecting claims 73-82 under 35 USC 102. Van Ketwich describes a touch screen assembly having an active surface area that extends in three dimensions, such as a concave or convex channel configuration. In Figures 10a and 10b, it depicts a pivot button 1755 that is engaged on the channel 1712. The pivot button may be pushed manually in directions A, B, or C to provoke a touch detection, or may be slid along the channel for the same purpose.

Although van Ketwich does provide a mechanical device that provokes a touch detection, it is capable of operation only in conjunction with the unique, channel-formed touch screen of van Ketwich. It cannot operate in association

with any other common form of flat panel touch screen, and is thus limited to a single designated use. In contrast, the present invention provides a plurality of control devices that may operate with a wide variety of flat panel touch screen devices, both capacitive (rf) and resistive. Moreover, the control devices of the present invention are designed to be placed at any point on a display, whereas the van Ketwich device is limited to the small warped channel portion of its touch screen. The control devices of the present invention may be removed at placed at new locations on a display, an advantageous characteristic that is impossible with the van Ketwich device. In addition, the present invention describes several ways in which a multitude of control devices may be operated simultaneously, whereas van Ketwich cannot resolve the touch of more than one pivot button 1755.

Claims 84-91 stand rejected under §102 over the Jaeger '955 patent. This reference describes a plurality of control devices that are applied to a display screen to enable a user to manipulate the controls in correspondence with the graphic output of the display. The control devices are provided with sensors to detect control movement and generate control signals that are fed to the computer (or similar device) that operates the display. The sensors may be placed behind the display screen, or coupled to the control device, but in no case are the control devices capable of interacting with a touch screen associated with the display screen. Indeed, "touch screen" is never mentioned in the '955 patent. The reference never discloses any means for provoking a touch detection by a touch screen. Once again, the reference has been interpreted in a manner that is entirely unsupported by the disclosure of the reference.

Among the secondary references applied in the instant Action, the Chan patent is cited for a showing of mouse emulation software used to interpret touch pad inputs as equivalent mouse control signals. It is noted that Chan's touchpad receives either a fingertip touch or a stylus tip touch, and that there is no disclosure of any other form of control device for provoking a touch signal from a touch screen. Thus the combination of Jaeger '355 with Chan is fundamentally deficient, in that the combination lacks any teaching of control devices that provoke a touch detection by a touch screen.

The Milam patent is cited in combination with Jaeger '355 in rejecting claims 47, 48, 50, and 51. The rejection states, "However, Milam teach (sic) an input device of different types including touch sensitive display capable of processing and storing information received and transmitted by the radio frequency section." This statement is baffling, in that there is no factual support in the reference to support it. Milam never mentions a touch sensitive display. Rather, it describes a radio system in which a plurality of radios are connected to a common antenna, each radio operating in a discrete frequency band to avoid interference between the radios. There is no teaching or suggestion of applying this disclosure to a touch screen, nor of applying it to a plurality of control devices that interact with a touch screen. Note that the Jaeger '355 patent likewise does not disclose control devices for use with a touch screen, and the combination of Jaeger '355 with Milam fails to provide a sufficient basis for this rejection.

The Holehan reference is cited in combination with Jaeger '355 and Milam to reject claims 49 and 52, which relate to an embodiment of the present invention

in which a plurality of control devices are operated on a touch screen and their discrete signals are transmitted by IR radiation at respective discrete bands. Holehan, however, describes a touchpad controller for a laptop computer in which a touchpad includes IR light sources and a CCD detector disposed below a glass screen, and the user places a fingertip on the screen so that the system may read the fingerprint. The system also may be used to detect the position of a stylus input or a fingertip touch input. Although col. 4, lines 54 et seq of Holehan mentions plural IR sources of slightly differing wavelength, this arrangement is provided "to aid in triangulating the position of the object." (col. 5, line 2). That is, Holehan clearly states that its device tracks a single object.

In contrast, the IR embodiment of the present invention is designed specifically to enable the use of multiple control devices. As noted on page 36, line 20 to page 37, line 5 of the application: "The transmitter/detector units are adapted to receive the discrete signals of the plurality of mechanical controllers, and to evaluate each discrete signal to determine the touch point of each mechanical controller. The number of devices used is limited only by the filter bandwidth and the processing power of the electronic interface. An alternative to this approach is to use discrete bands of IR (infrared light) rather than RF. Each device emits a signal within a discrete IR band, and the sensing receivers are filtered to distinguish the signals in each band." In this regard, the Holehan is completely lacking in any relevant disclosure of multiple control devices. Given this fact, and the lack of any teaching of control devices applied to a touch screen, it is apparent that this rejection is not supportable by the prior art.

The Leung patent is cited in combination with Jaeger '355 patent to reject claims 60-65. Leung describes a touch control input device that includes a joystick-like member that is manipulated by a user. A plurality of force sensors coupled to the member resolve the force vectors and convert them into computer control signals. Leung lacks any teaching of combining a joystick-type device with a touch screen so that the joystick transmits touch-stimulating signals to a touch screen that may be interpreted by the system as computer inputs. Given the fact that Jaeger '355 also fails to teach or suggest any control device that operates with a touch screen, the combination of references does not support the rejection of these claims.

The Zimmerman reference is cited in combination with Jaeger '355 to reject claims 69-71. Zimmerman describes a trackpoint-like joystick that is used as an input to a computer. The assembly includes an articulating member having a lower end proximate to an array of sensors that detect user movement of the upper end of the articulating member. The sensors are supported on a PCB or the like, not a touch screen, and the only relevance to the claimed invention appears to be the flexible wire 32 that resiliently maintains the quiescent position of the articulating member. However, the combination of references fails to teach or even suggest the use of a joystick to provoke touch signals in conjunction with a touch screen.

The claims have been amended to particularly point out the unique and patentable aspects of the present invention. Claim 1, the primary independent claim, has been amended to recite that the device of the invention provides input

to a generally flat touch screen. This added recitation is in direct contrast to the van Ketwich reference, the only citation that discloses a mechanical device for inputting to a touch screen. As noted above, van Ketwich requires a touch screen that is warped into a channel configuration, and the mechanical control device comprises a pivot button secured to the channel and adapted to be translated therealong. This arrangement is severely limited in its ability to be reconfigured, and cannot be employed on a touch screen that is generally flat and lacking a channel portion. Thus the recitation of a generally flat touch screen is a defining limitation with respect to the van Ketwich patent.

Claim 1 also recites "means associated with said base member for provoking a touch detection by the touch screen." As noted in the discussion above, none of the other references cited in the Office Action describe any form of device that provokes a touch detection by a touch screen. Thus this limitation is definitive in raising the invention to a patentable level with respect to the prior art. It is asserted that claim 1 should now be allowed. The added limitations imparted by dependent claims 2-72 further refine the patentable structure, and are also allowable. With regard to claim 19, which is directed to the crack-and-peel embodiment of Figure 35, there is no teaching in any of the references that suggests this feature.

Claims 25, 66, and 93 have been amended to correct antecedent bases of their respective dependencies, as noted in the rejection under §112. Thus the §112 rejection has been overcome.

Independent claims 73 and 80, which stand rejected over van Ketwich, have been amended by the recitation that the web is generally planar, in contrast to the van Ketwich device which requires a warped channel-like touch screen. This addition renders these claims allowable over the reference. Also, claim 83, which depends from claim 80, has been amended to state that the longitudinal web is curved in a closed loop in the plane of the web, thus also defining the structure of the claim over the van Ketwich patent. Note that there is no way that van Ketwich could not be operated to simulate a rotating knob function.

Claim 84, which is direct to the flexible extendable track embodiment of the invention, has been amended to include means extending from the flexible track for provoking a touch detection by the touch screen. This structure is completely lacking in the Jaeger '955 patent, which has been cited in rejecting this claim. This addition clearly distinguishes the claimed invention over the prior art, and claim 84 should now be allowed.

Applicant has submitted herewith a proposed drawing correction that suggests changes to the drawing figures to provide correct correspondence between the drawings and the specification. Applicant requests approval of the proposed drawing correction. No new matter has been presented in the drawing correction.

Applicant believes that all claims now presented define the invention patentably over the prior art, and are allowable. There being no other outstanding issues to resolve, this application should be in condition to be passed to issue. Action toward that end is earnestly solicited.

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Appendix A

Clean Copy of Claims

1. A device for providing input to a generally flat touch screen, including:

a base member and means for securing said base member to the touch screen;

means associated with said base member for provoking a touch detection by the touch screen.

2. The device for providing input to a touch screen of claim 1, wherein said base member includes a longitudinally extending rib having a bottom surface adapted to impinge on the touch screen.

3. The device for providing input to a touch screen of claim 2, wherein said rib is sufficiently flexible to be deflected by a fingertip touch at an outer surface of said rib and said bottom surface is likewise deflected to provoke a touch detection.

4. The device for providing input to a touch screen of claim 2, wherein said rib is formed of a material sufficiently lubricious to enable a sliding touch along said rib.

5. The device for providing input to a touch screen of claim 3, further including a fader cap, and means for securing said fader cap to said rib in longitudinally sliding fashion.

6. The device for providing input to a touch screen of claim 5, wherein said means for securing said fader cap includes at least one flange extending longitudinally along said rib, said fader cap including a structural element adapted to engage said flange in freely sliding fashion.

7. The device for providing input to a touch screen of claim 5, further including a stylus tip extending from said cap toward said touch screen.

8. The device for providing input to a touch screen of claim 7, wherein the touch screen is adapted to detect the position of a touch signal applied thereto, said fader cap including means for generating said touch signal and transmitting said touch signal through said stylus tip to said touch screen.

9. The device for providing input to a touch screen of claim 8, further including power supply means in said fader cap for driving said touch signal generator.

10. The device for providing input to a touch screen of claim 9, wherein said power supply means includes a battery.

11. The device for providing input to a touch screen of claim 9, wherein said power supply means includes a photovoltaic cell.

12. The device for providing input to a touch screen of claim 9, wherein said power supply means includes at least one power rail extending along said rib and electrically accessible by said touch signal generator in said fader cap.

13. The device for providing input to a touch screen of claim 12, further including at least one conductive trace extending to said base member and connected to said at least one power rail.

14. The device for providing input to a touch screen of claim 6, further including a pair of flanges disposed in lateral opposition and extending longitudinally along said rib.

15. The device for providing input to a touch screen of claim 13, further including a fader cap, said means for securing said fader cap including structural elements to engage said pair of flanges and retain said fader cap on said rib in freely sliding fashion.

16. The device for providing input to a touch screen of claim 2, further including a plurality of closely spaced feet projecting from said bottom surface of said rib to engage the surface of a touch screen device.

17. The device for providing input to a touch screen of claim 1, wherein said means for securing includes an adhesive layer formed on a bottom surface of said base member.

18. The device for providing input to a touch screen of claim 17, said adhesive layer being preferentially more adherent to said base member than to the surface of a touch screen device.

19. The device for providing input to a touch screen of claim 1, wherein a plurality of said devices are provided, said plurality of devices being joined in a crack-and-peel sheet.

20. The device for providing input to a touch screen of claim 1, wherein said base member comprises a post having a bottom surface adapted to impinge on the touch screen.

21. The device for providing input to a touch screen of claim 20, further including a knob cap secured coaxially to said post and adapted for rotation about a common axis.

22. The device for providing input to a touch screen of claim 21, further including a stylus tip extending from said knob cap toward said touch screen.

23. The device for providing input to a touch screen of claim 22, wherein the touch screen is adapted to detect the position of a touch signal applied thereto, said knob cap including means for generating said touch signal and transmitting said touch signal through said stylus tip to said touch screen.

24. The device for providing input to a touch screen of claim 23, further including power supply means in said knob cap for driving said touch signal generator.

25. The device for providing input to a touch screen of claim 1, further including an RF power supply means driven by a battery.

26. The device for providing input to a touch screen of claim 24, wherein said power supply means includes a photovoltaic cell.

27. The device for providing input to a touch screen of claim 24, wherein said power supply means includes a conductive trace extending to said base member.

28. The device for providing input to a touch screen of claim 1, further including power supply means for operating said means for provoking a touch detection, said power supply means includes means for transmitting RF power wirelessly to said device.

29. The device for providing input to a touch screen of claim 1, further including power supply means for operating said means for provoking a touch detection, said power supply means includes means for transmitting IR power wirelessly to said device.

30. The device for providing input to a touch screen of claim 1, further including a groove formed in the touch screen, said base member being received and recessed in said groove.

31. The device for providing input to a touch screen of claim 30, wherein said device includes a knob controller.

32. The device for providing input to a touch screen of claim 30, wherein said device includes a fader track.

33. The device for providing input to a touch screen of claim 30, wherein said device includes a joystick.

34. The device for providing input to a touch screen of claim 20, further including a computer having a graphic display associated with the touch screen, and software means for receiving touch input provoked by said post with fingertip pressure.

35. The device for providing input to a touch screen of claim 34, said software means including means for analyzing touch inputs provoked by said post with fingertip pressure and emulating specific diverse controller characteristics in response to said touch inputs.

36. The device for providing input to a touch screen of claim 35, wherein said software means includes menu selections to elicit selection of various controller emulations related to said post.

37. The device for providing input to a touch screen of claim 35, said software means including means for analyzing initial touch inputs provoked by said post with fingertip pressure and determining the center point of said initial touch inputs.

38. The device for providing input to a touch screen of claim 37, wherein said software means further places a graphic symbol on said graphic display corresponding to the center point location ascribed to said post

39. The device for providing input to a touch screen of claim 38, wherein said graphic symbol further portrays a controller function.

40. The device for providing input to a touch screen of claim 35, wherein said software means provides a fader controller emulation and interprets generally linear touch pattern along a defined axis as a command to change the value of a parameter associated with the fader controller emulation.

41. The device for providing input to a touch screen of claim 37, wherein said software means provides a joystick controller emulation and interprets a linear touch pattern at any angle from said center point as a command to move a graphic at the same angle on the display.

42. The device for providing input to a touch screen of claim 41, wherein the rate of movement of the graphic is set by said software means.

43. The device for providing input to a touch screen of claim 41, wherein the rate of movement of the graphic is proportional to the amount of time that a touch detection is maintained at any given angle.

44. The device for providing input to a touch screen of claim 37, wherein said software means provides a mouse controller emulation and interprets a touch detection displaced from said center point at an angle thereabout as a command to move a cursor at the same angle on the display.

45. The device for providing input to a touch screen of claim 1, further including a plurality of said devices, said touch screen including means for detecting simultaneous operation of said plurality of devices.

46. The device for providing input to a touch screen of claim 45, wherein each of said plurality of devices includes means for generating a touch signal and transmitting said touch signal through a stylus tip to said touch screen.

47. The device for providing input to a touch screen of claim 46, wherein each means for generating a touch signal of each respective device operates within a respective discrete frequency or wavelength band.

48. The device for providing input to a touch screen of claim 47, wherein said means for detecting simultaneous operation includes multiple discrete band RF touch position determination means.

49. The device for providing input to a touch screen of claim 47, wherein said means for detecting simultaneous operation includes multiple discrete wavelength IR touch position determination means.

50. The device for providing input to a touch screen of claim 47, wherein each of said multiple discrete bands of said touch determination means

corresponds to one of said discrete frequency or wavelength bands of said plurality of means for generating touch signals.

51. The device for providing input to a touch screen of claim 50, wherein said multiple discrete band RF touch position determination means includes a plurality of multi-band RF transmitter/detector units disposed about the touch screen.

52. The device for providing input to a touch screen of claim 49, wherein said multiple discrete band IR touch position determination means includes a plurality of multi-band IR transmitter/detector units disposed about the touch screen.

53. The device for providing input to a touch screen of claim 45, wherein said touch screen includes resistive touch detection means, and further includes a plurality of discrete sensing areas.

54. The device for providing input to a touch screen of claim 53, wherein said plurality of discrete sensing areas are in contiguous arrangement within a single touch screen.

55. The device for providing input to a touch screen of claim 54, wherein each of said sensing areas is bordered by sensing electrodes that locate a touch within the respective sensing area.

56. The device for providing input to a touch screen of claim 54, wherein at least one of said plurality of devices is operable in a respective one of said sensing areas.

57. The device for providing input to a touch screen of claim 20, said post including a recess formed in said bottom surface, and an adhesive layer disposed in said recess.

58. The device for providing input to a touch screen of claim 57, wherein said adhesive layer is greater in thickness than the depth of said recess, and a peripheral edge portion of said bottom surface is disposed in minimally spaced apart disposition to the touch screen.

59. The device for providing input to a touch screen of claim 20, wherein said post includes a top surface having a contoured configuration.

60. The device for providing input to a touch screen of claim 20, wherein said post includes a top surface having a cushion layer adhered thereto.

61. The device for providing input to a touch screen of claim 20 wherein said post includes a top surface, and further including a rocker plate secured at said top surface.

62. The device for providing input to a touch screen of claim 61, wherein said rocker plate includes a lug projecting from a medial portion thereof, and a central opening in said top surface dimensioned to receive said lug in snap-engaged, freely rotating fashion, said rocker plate being spaced apart from said top surface and rockable about said lug in any direction.

63. The device for providing input to a touch screen of claim 20, wherein said post includes a mushroom configuration having a crown supported on a narrow stem.

64. The device for providing input to a touch screen of claim 63, wherein the bottom surface of said stem is secured to the touch screen.

65. The device for providing input to a touch screen of claim 20, said post including a base and a distal end, and said distal end is wider than said base.

66. The device for providing input to a touch screen of claim 20, said post including a base and a distal end, and said base is wider than said distal end.

67. The device for providing input to a touch screen of claim 1, wherein said base member defines a bottom opening, a control rod having a lower end with a stylus tip, and means for supporting said control rod on said base member with said stylus tip spaced closely to the touch screen to provoke a touch detection.

68. The device for providing input to a touch screen of claim 67, said means for supporting said control rod including a universal bearing engaging a medial portion of said control rod.

69. The device for providing input to a touch screen of claim 68, further including a membrane extending radially from said control rod to said base member, said membrane formed of an elastic, resilient web.

70. The device for providing input to a touch screen of claim 67, said means for supporting said control rod including a first membrane extending radially from a medial portion of said control rod to said base member, said first membrane formed of an elastic, resilient web.

71. The device for providing input to a touch screen of claim 70, further including a second membrane extending radially from an upper end of said control rod to said base member, said second membrane formed of an elastic, resilient web.

72. The device for providing input to a touch screen of claim 68, said stylus tip being mounted in telescoping fashion in said lower end of said control rod, and resilient means for biasing said stylus tip to extend toward the touch screen.

73. A capacitive touch sensor controller, including:

a generally planar web extending longitudinally;

a pair of sensor electrodes secured to longitudinally opposed ends of said web;

a conductive layer secured to said web;

at least one power rail extending longitudinally along said web between said sensor electrodes;

software means connected to said sensor electrodes for determining the position of a touch point on said web.

74. The touch sensor controller of claim 73, wherein said software means includes means for emulating a fader controller in response to sliding touch on said web.

75. The touch sensor controller of claim 73, further including a guide ridge extending longitudinally on said web and disposed to guide a sliding touch longitudinally therealong.

76. The touch sensor controller of claim 75, further including a groove extending longitudinally in said guide ridge to guide a stylus in sliding translation therealong.

77. The touch sensor controller of claim 75, further including a fader cap slidably secured to said guide ridge.

78. The touch sensor controller of claim 77, further including a stylus tip extending from said fader cap toward said longitudinal web.

79. The touch sensor controller of claim 78, further including a touch signal generator disposed in said fader cap and connected to said stylus tip.

80. A resistive touch sensor controller, including:

a generally planar web extending longitudinally;

a pair of electrical contacts secured to longitudinally opposed ends of said web;

a conductive layer secured to said web;

software means connected to said electrical contacts for determining the position of a touch point on said web as a function of said signals.

81. The touch sensor controller of claim 80, wherein said software means includes means for emulating a fader controller in response to sliding touch on said web.

82. The touch sensor controller of claim 81, further including a guide ridge extending longitudinally on said web and disposed to guide a sliding touch longitudinally therealong.

83. The touch sensor controller of claim 80, wherein said longitudinal web is curved in the plane of said web into a closed loop emulative of circular knob rotation.

84. A device for providing input to a generally flat touch screen having a peripheral edge, including:

a flexible track mounted at the peripheral edge of the touch screen, said flexible track being extendable along an axis extending inwardly on said screen;

means extending from said flexible track for provoking a touch detection by said touch screen; and,

means for detecting extension and retraction of said flexible track with respect to the peripheral edge of the touch screen and correlating the extension and retraction with a controller function.

90. The device for providing input to a touch screen of claim 84, further including keeper means for directing said flexible track along said axis.

91. The device for providing input to a touch screen of claim 90, wherein said keeper means includes means for maintaining contact of said cap on the touch screen.

92. The device for providing input to a touch screen of claim 10, wherein said fader cap includes touch switch means for connecting said battery to said touch signal generator in response to fingertip touch on said fader cap.

93. The device for providing input to a touch screen of claim 25, further including a knob cap having a touch switch for connecting said battery to said touch signal generator in response to fingertip touch on said knob cap.

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